

## ORIGINAL ARTICLE

### Clinico-epidemiological profile of rabies cases admitted at a tertiary level infectious disease Hospital, Kolkata

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#### Abstract:

**Background:** Though most of the developed countries have eliminated rabies, but it still remains as a poorly controlled endemic disease in a majority of the developing countries. Estimating the rabies burden for high risk developing countries in paucity of reliable surveillance data has been a huge challenge. With this background the present study is carried out with the objective to assess the profile of clinically suspected rabies cases admitted in a tertiary care infectious disease hospital, Kolkata. **Methodology:** A hospital record based retrospective study was conducted taking all the 264 admitted cases with clinical features suggesting rabies during January'2012 to December'2018 in this Hospital. **Results:** year wise admission rate of rabies cases were 32,35,40,41, 43, 34 & 39 respectively from 2012 to 2018. Among 264 suspected rabies cases 20.1% were children below 10 years & 13.4% were elderly; 72.7% were male; 79.9% Hindu, 53% belonged to rural areas and 78.4% victims were bitten by dog. Only 23.5% had initiated PEP, among them only 32.3% had taken full course of ARV, 4.2% of documented category III bite didn't receive RIG. Patients presented with hydrophobia (88.3%), aerophobia (84.8%), restlessness (26.9%), altered sensorium (11%), disorientation (7.6%) etc. **Conclusion:** The present study indicated that majority of the cases had not received PEP, either due to ignorance or due to lack of access. Initiative should be taken for awareness generation programme among community people regarding importance of local wound management and need for early initiation & adherence to immunization.

**Key words:** Rabies, PEP, ARV, Animal bite

#### Introduction:

Rabies is a 100% fatal but completely preventable, viral zoonotic disease of the CNS. Over 95% of human deaths occur in Asia and Africa, and around 90% of these deaths occur among rural children. Out of a whopping 59,000 rabies deaths from across the world each year, India alone contributes for 18,000 to 20,000 deaths.<sup>1</sup>

Bites, scratches and licks of rabid animals can transfer the rabies virus in their saliva to the patient. Rabies is insidious in onset after a variable incubation period of 1- 3 months (ranging from 4 days to 19 years) depending upon severity of bite exposure & proximity of site of bite to CNS.<sup>2</sup>

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At onset, there are non-specific prodromal symptoms of headache, malaise, sore throat, slight fever (lasting for 3-4 days), pain or tingling at the site of bite; which are frequently unrecognised by clinicians leading to significant delays in diagnosis.<sup>2</sup>

While a majority of rabies cases are of classic encephalitic or furious form, a few of them also manifest as progressive paralytic illness. Features of 'hydrophobia' is seen in 50% to 80% of the cases, presents with morbid dread of water, extreme fearfulness of swallowing liquids resulting from painful spasms of throat, dysphagia, hyper-salivation, agitation alternating with calm, restlessness. Local sensory symptoms i.e. paraesthesia & itching occurs in 30% of both furious & paralytic patients. Rabies progresses through various stages- confusion, coma & ultimately inevitable death in virtually all cases. Patients with furious rabies die earlier (average 5 days) than paralytic form (average 13 days). Diagnosing paralytic rabies cases present a greater challenge as hydrophobia & hyper-salivation appear late in the course and are usually mild. The diversity in the clinical presentation of rabies may be attributable to different viral tropisms, routes of neural spread, different sites of neural involvement, variable immune responses and/or other pathologic mechanisms.<sup>2</sup>

Despite being 100% fatal, rabies can be easily prevented. Following the bite of suspected rabid animal, proper post exposure prophylaxis (PEP) includes 3 steps – thoroughly washing the wound with soap and running tap water for minimum 10 minutes, local infiltration of wound with anti-rabies immunoglobulin (RIG), followed by active immunisation by anti-rabies vaccine (ARV).

Lack of awareness of preventive measures, ignorance about importance of immediate wound management and PEP, non-compliance to vaccination schedule, insufficient dog vaccination and unchecked growth of canine population are some of the major factors behind the high occurrence and casualty rate for rabies. Moreover, animal bite victims further suffer due to myths and misconceptions surrounding rabies, high costs or non-availability of ARV & RIG.<sup>1</sup>

The major hindrance for low level of political and academic commitment to rabies control is lack of accurate data regarding the actual public health impact of the disease. That the number of officially reported deaths greatly underestimates the true incidence of disease is a widely recognized fact. Since death is inevitable following clinical onset, a large number of rabies cases go unreported by not seeking health-care. Those which do get reported, many are frequently misdiagnosed as other neurological syndromes as very few cases receive laboratory confirmation. Additionally, clinical cases are often not reported by local authorities to central authorities.<sup>3</sup>

Reliable and regular basic information on rabies mortality and the economic burden of preventing rabies are crucial to implement sustainable control programmes in order to achieve the goal of 'Zero Rabies deaths by 2030'.

With this perspective, the present study was carried out in one of the apex infectious disease hospital of Kolkata, where all the clinically suspected rabies cases from all over West Bengal & surrounding districts of adjacent states are usually referred for palliative management.

### Objectives:

1. To assess the socio-demographic profile of suspected rabies cases admitted at I.D. & B.G Hospital, Kolkata.
2. To find out the details about their previous animal bite exposure & treatment received.
3. To determine the presenting clinical features of rabies cases & their management.

### Materials & methodology:

The present hospital based descriptive study was conducted at I.D. & B.G. Hospital, Kolkata after obtaining necessary permission. A total of 264 suspected rabies cases, admitted at the infectious disease wards of this Hospital from January' 2012 to December'2018 for palliative care, were taken as study subjects. Data were collected from BHTs kept at hospital record section and analyzed retrospectively during March-May'2019. Clinical records contain data on victims' age, gender, residence, marital status, date of admission & death, h/o animal bite exposure & treatment

received, interval between bite & admission, presenting clinical features suggestive of rabies, treatment received while admitted etc. The collected data were entered in MS Excel & analyzed by SPSS 20.0.

## Results:

The present study was carried out at I.D. & B.G. Hospital of Kolkata during March 2019 to May 2019 through record analysis of 264 admitted patients from January'2012 to December'2018. Results revealed that mean age of rabies patients admitted during last 7 years was  $36.65 \pm 22.18$  (mean $\pm$ SD).

**Table.1: Distribution of rabies patients according to age category & gender (N=264)**

Age category	Gender		Total
	Male	Female	
	No. (%)	No. (%)	No. (%)
< 10 years	32 (12.1)	21 (8.0)	53 (20.1)
11-20 years	23 (8.7)	2 (0.8)	25 (9.5)
21-30 years	26 (9.8)	3 (1.1)	29 (10.9)
31-40 years	31 (11.7)	8 (3.0)	39 (14.7)
41-50 years	24 (9.1)	13 (4.9)	37 (14.0)
51-60 ears	37 (14.0)	9 (3.4)	46 (17.4)
>60 years	19 (7.3)	16 (6.1)	35 (13.4)
<b>Total</b>	<b>192 (72.7)</b>	<b>72 (27.3)</b>	<b>264 (100.0)</b>

Majority of the rabies patients were male (72.7%). Overall 20.1% victims were children aged below 10 years (**Table.1**).

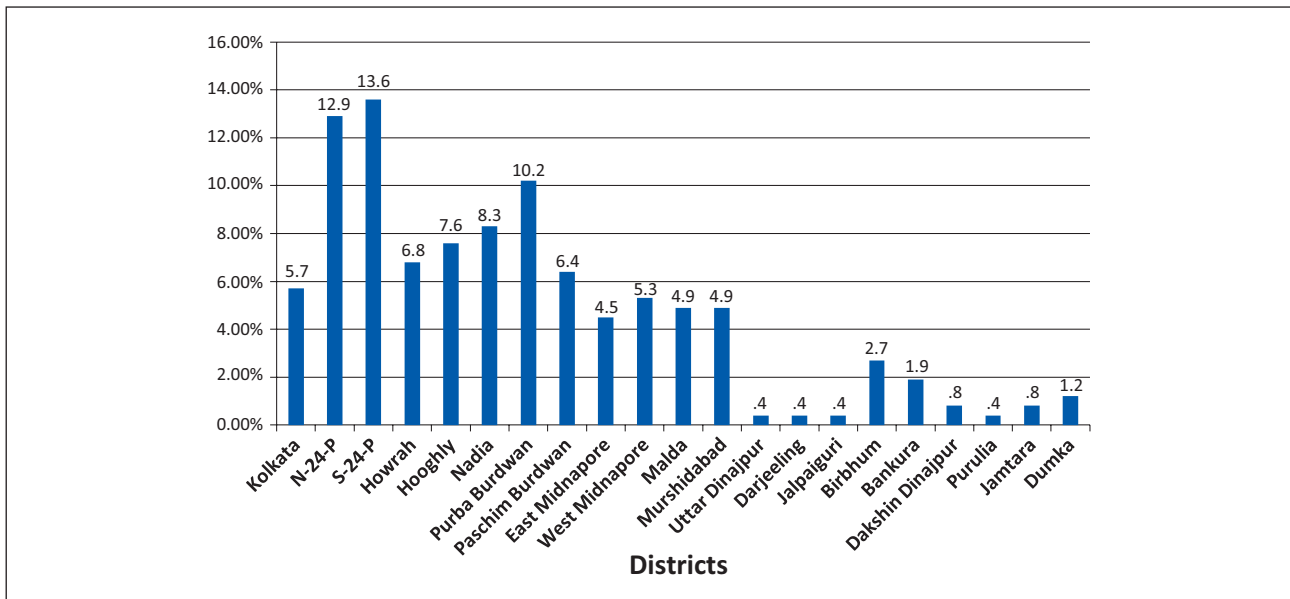
Most of the rabies patients (79.9%) belonged to Hindu religion, 19.7% were Muslim and rest 0.4% were Christian. Among 264 rabies victims 35.2% were married, 58.3% were single and 6.4% were widow/ widower.

**Table.2: Distribution of rabies patients according to year of admission & residence (N=264)**

Year of admission	Residence		Total
	Rural	Urban	
	No. (%)	No. (%)	No. (%)
2012	24 (9.0)	8 (3.0)	32 (12.1)
2013	27 (10.2)	8 (3.0)	35 (13.2)
2014	25 (9.5)	15 (5.7)	40 (15.2)
2015	17 (6.4)	24 (9.1)	41 (15.5)
2016	17 (6.4)	26 (9.8)	43 (16.2)
2017	11 (4.2)	23 (8.7)	34 (12.9)
2018	19 (7.3)	20 (7.6)	39 (14.9)
<b>Total</b>	<b>140 (53.0)</b>	<b>124 (47.0)</b>	<b>264 (100.0)</b>

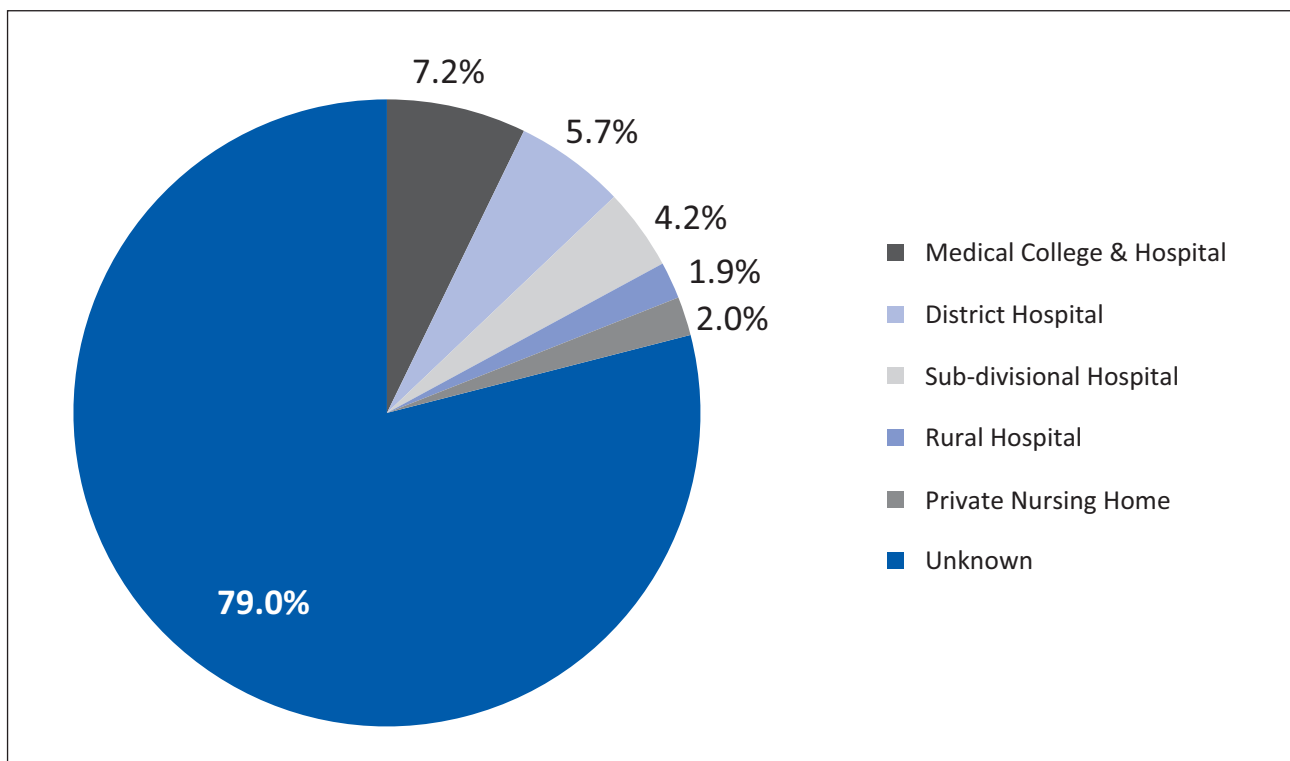
There was no year wise variation of admission whereas slightly higher proportion of patients were from rural area (53%) compared to urban area (47%) (**Table.2**).

**Figure. 1: Simple bar diagram showing distribution of rabies patients according to the districts they belonged to. (N=264)**



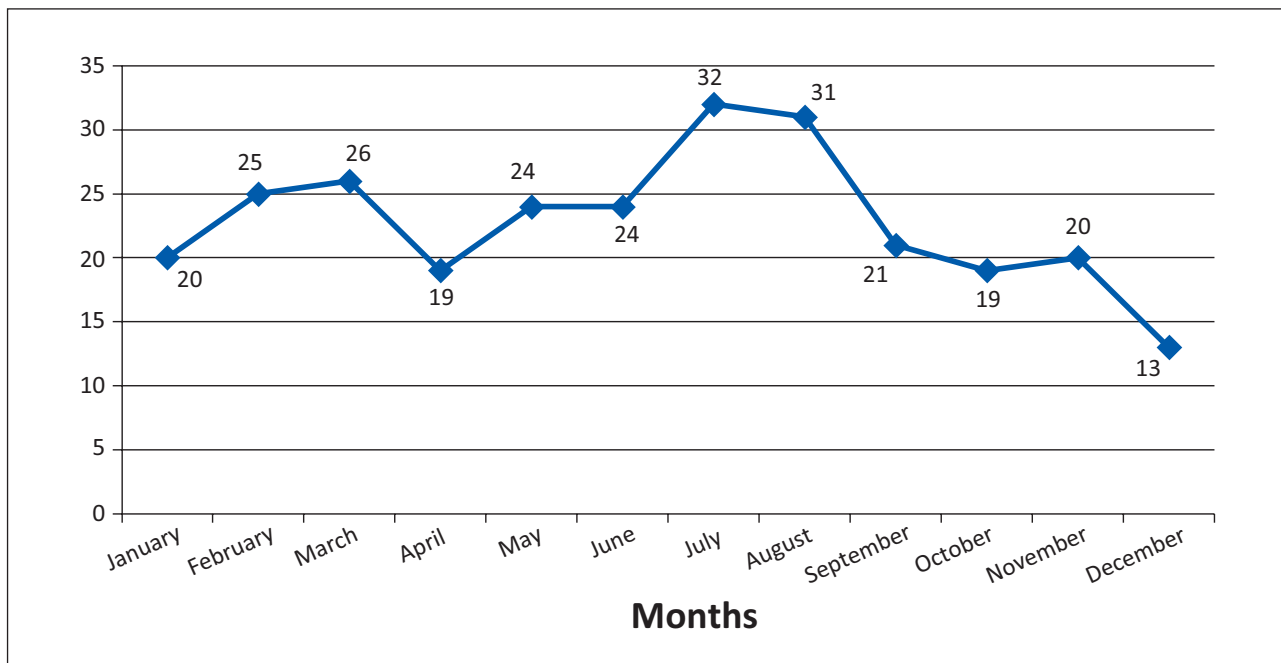
It was revealed that majority of the rabies patients belonged to S-24-P (13.6%), followed by surrounding districts of N-24-P (12.9%), Purba Burdwan (10.2%), Nadia (8.3%), Hooghly (7.6%), Howrah (6.8%), Paschim Burdwan (6.4%), Kolkata (5.7%) etc. Though majority of the patients (98.1%) were from West Bengal, a few patients (1.9%) also came from border districts of Jharkhand (Fig.1).

**Figure. 2: Pie diagram showing distribution of rabies patients according to the level of referring hospital (N=264)**



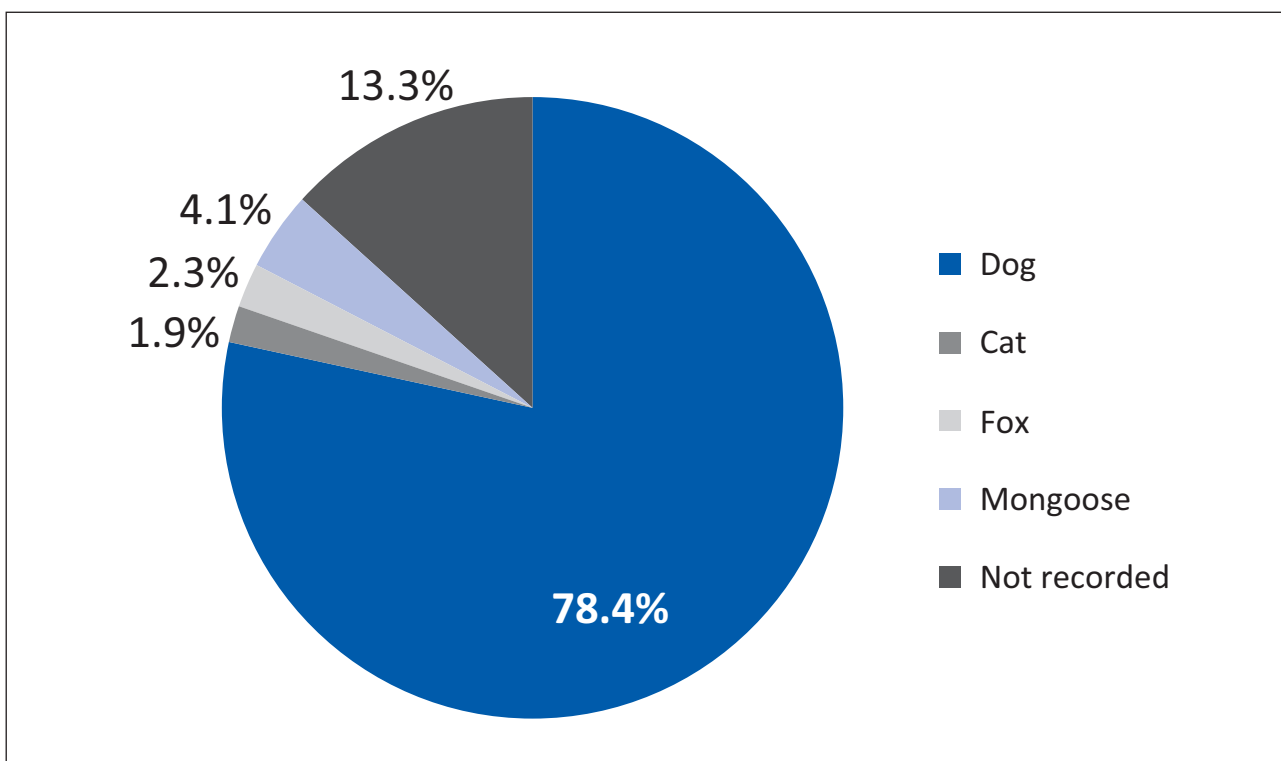
Overall 21% rabies patients were documented to be referred from other Govt. hospitals & private nursing homes (Fig.2).

**Figure. 3: Line diagram showing month-wise admission of rabies cases during last 7 years (N=264)**

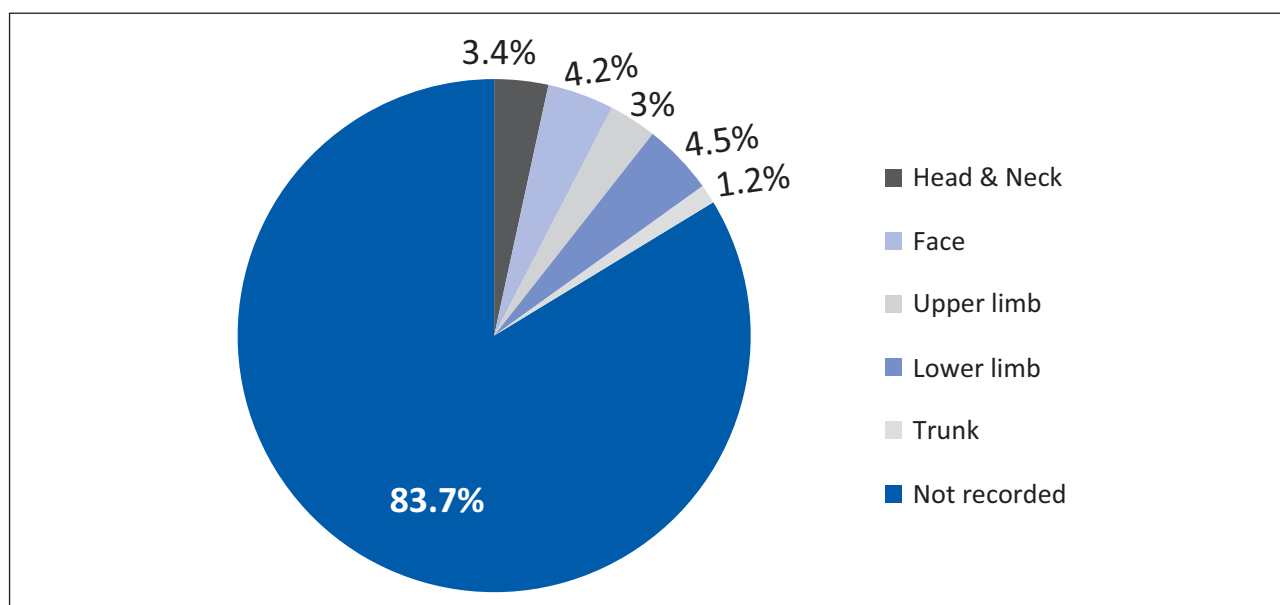


There were 2 peaks in admission rate of rabies cases was noticed during the month of March and July- August (Fig.3).

**Figure.4: Pie diagram showing distribution of biting animals responsible for occurrence of rabies in study population (N=264)**



Most common biting animal is found to be dog (78.4%), followed by mongoose (4.1%), fox (2.3%), cat (1.9%) (Fig.4).

**Figure.5: Pie diagram showing distribution of rabies patients according to site of bite (N=264)**

In majority of the cases (83.7%), family members of rabies patients could not provide definitive history about site of bite. Available documentation revealed that most common site of bite was lower limb (4.5%), followed by face (4.2%), head- neck region (3.4%), upper limb (3.0%) & trunk (1.2%) (Fig.5).

**Table.3: Distribution of rabies patients according to category of exposure & PEP received (n=62)\***

Post-exposure prophylaxis	Exposure category		Total
	Cat-II	Cat-III	
	No. (%)	No. (%)	No. (%)
Full course of ARV	13 (21.0)	7 (11.3)	20 (32.3)
Partially vaccinated	9 (14.5)	7 (11.3)	16 (25.8)
Skipped 4th dose	11 (17.7)	15 (24.2)	26 (41.9)
<b>Total</b>	<b>33 (53.2)</b>	<b>29 (46.8)</b>	<b>62 (100.0)</b>

\*Overall 100 patients (37.9%) were not vaccinated & vaccination status of 102 (38.6%) patients was not recorded.

Among the rabies patients only 62 (23.5%) had shown documented history of category of exposure & starting PEP. Out of the vaccinated patients only 32.3% has taken full course of ARV, 25.8% were partially vaccinated & 41.9% skipped the last dose of ARV (Table.3).

Out of the documented category III bite cases 4.2% didn't received RIG. Initiation of PEP was delayed by 14 patients, ranging from 1-27 days. Two patients had history of wound suturing on the 1st day.

**Table.4: Distribution of rabies patients according to incubation period (N=264)**

Incubation period	No.	Percentage
<1 month	86	32.5
1-3 month	73	27.7
3-6 month	29	11.0
6-12 month	9	3.4
1-2 years	4	1.5
>2 years	5	1.9
Unknown	58	22
<b>Total</b>	<b>264</b>	<b>100.0</b>

Range of incubation period was from less than 1 month to 22 years. Overall 32.5% patients had incubation period of 1 month & 27.7% developed rabies within 1-3 months period (Table.4).

**Table.5: Distribution of rabies patients according to presenting clinical features (N=264)\***

Clinical presentation	No.	Percentage
Altered sensorium	29	11.0
Drowsiness	7	2.7
Disorientation	20	7.6
Drooling of saliva	15	5.7
Convulsion	8	3.0
Restlessness	71	26.9
Irritation	6	2.3
Abnormal behaviour, violent	18	6.8
Dysphagia	19	7.2
Hydrophobia	233	88.3
Aerophobia	224	84.8
Photo-phobia	4	1.5
Noise phobia	2	0.8
Spasm/ rigidity	10	3.8
Encephalitis	14	5.3
Paralysis	8	3.0
Difficulty in speech	4	1.5
Nasal intonation of voice/ coarse voice	4	1.5
Fever	9	3.4
Cellulitis, septicaemia	4	1.5
Vomiting	7	2.7
Severe dehydration	2	0.8
Respiratory distress	10	3.8
Cardio-respiratory failure	49	18.6

\*multiple response table

The common clinical presentations were found to be hydrophobia (88.3%), followed by aerophobia (84.8%), restlessness (26.9%), cardio-respiratory failure (18.6%), altered sensorium (11.0%), disorientation (7.6%), dysphagia (7.2%), abnormal violent behaviour (6.8%), salivation (5.7%), encephalitis (5.3%) etc (Table.5).

Patients were treated symptomatically with IV fluid & drugs e.g.- antibiotics, anti-pyretic medicines, antacid, anti-emetic drugs, anti-viral agents, inj mannitol, anti-convulsant drugs as necessary for individual cases. After being admitted in this hospital 6 patients were initiated with ARV schedule.

Few rabies patients were reported to be addicted to alcohol and cannabis (3%), 2.7% had concomitant chronic diseases eg.- hypertension, diabetes mellitus etc, 2 patients were immune-compromised.

263 patients died in hospital & attendants of 1 patient took their patient back home against medical advice after knowing about prognosis of disease.

**Table.6: Distribution of rabies patients according to duration of hospital stay (N=264)**

Duration of hospital stay	No.	Percentage
<1 day	60	22.7
1-3 days	170	64.4
4-6 days	27	10.2
>6 days	7	2.7
<b>Total</b>	<b>264</b>	<b>100.0</b>

Majority of the patients (87.1%) died within 3 days of admission (Table.6).

## Discussion:

Present study revealed that majority (72.7%) of the rabies cases were males, similar to observations made by Bedi R.1 (81.8%), Kumar A.3(72.4%), Madhav A.6 (68.4%), Mohammad K.4 (83.5%). Children aged <10 years constituted 20.1% victims in the present study corroborated to observations made by Kumar A.3(23.7%), Madhav A.6 (27.6%). Majority (53%) of the cases belonged to rural areas in the present study, which is similar to findings of Bedi R.1 (78.6%). Dog was found to be the most common biting animal in 78.4% victims of the study; similar findings observed by Kumar A.3(96%), Mohammad K.4 (94.3%). Lower limb represented the commonest bite location in the present study, similar findings were revealed by Bedi R.1 (54.8%), Kumar A.3(66%).

The present study illustrates that most patients (37.9%) didn't received PEP, which corroborated with the findings of Bedi R.1(37.5%), but Kumar A.3 and Mohammad K.4 reported a much higher proportion of unvaccinated victims: 94.9% and 78% respectively. It was found that only 23.5% initiated PEP & among them only 32.3% had completed the course of ARV. Mohammad K.4 also found that only 15% were fully or partially vaccinated.

Present study found that incubation period for rabies was 1 month in 32.5% cases & 1-3 months in 27.7%. Similar results were obtained by Bedi R.1 (1 month in 35.7% & 1-3 months in 52.4%) and Madhav A.6 (1 month in 27.6%, 1-3 months in 45.9% cases).

The most common presenting clinical features were hydrophobia (88.3%), aerophobia (84.8%), restlessness (26.9%), abnormal violent behaviour (6.8%) etc. Kumar A.3 found hydrophobia & aerophobia in 100%, photophobia (87%), violent behaviour (34.62%). Mohammad K.4 also revealed that hydrophobia was found in 100%, aerophobia in 63% and violent behaviour among 2.9% patients.

In the present study 87.1% victims died within 3 days of admission in hospital, but Madhav A.6 found that similar proportion of patient (87.7%) died within 24 hours.

Present study found that there were 2 peaks in admission of rabies cases during March and July-August. Kalyani D.13 in a 3 year hospital record based study at Hyderabad also found that Rabies had two peaks in the month of March and May.

## Conclusion & recommendation:

From the present study it is evident that the majority of suspected human rabies cases admitted had not received PEP at all, & those who started PEP either delayed initiation of PEP or, had not completed the schedule, few category-III bite cases didn't received RIG.

The high mortality due to rabies might be attributed to lack of public recognition about the need of timely and complete PEP for animal bite management, lack of access to vaccine and immunoglobulin; along with myths & misconception causing negligence or unnecessary delay in treatment. Immediate measures must be taken for conducting mass awareness programme at community level regarding risk of developing deadly rabies disease after animal bites, measures for preventing rabies eg. adequate wound management with proper wound toileting & timely PEP, need for pet animal vaccination etc.

## Acknowledgement:

We are grateful to Hospital authority for giving us permission to collect the valuable hospital in-patient data for this research purpose. We are also very much thankful to the staffs of Hospital record section for their constant help and assistance in retrieving the relevant case records necessary for this study.

**Limitations:** The inherent limitation of hospital record based study is that the use of secondary data analysis may compromise the data quality because the researchers did not know exactly the process of primary data collection.

**Source of support:** nil

**Conflict of interest:** none declared



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